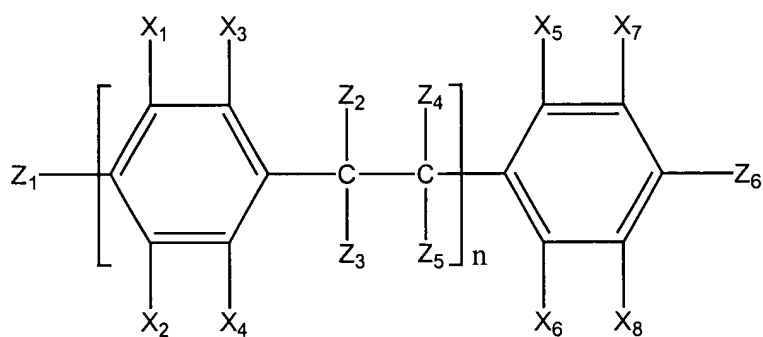


## THE CLAIMS

What is claimed is:

1. A golf ball comprising a core and a cover, wherein at least the core or the cover comprises an elastomeric composition comprising a base polymer and a carbon-carbon initiator having a formula of:

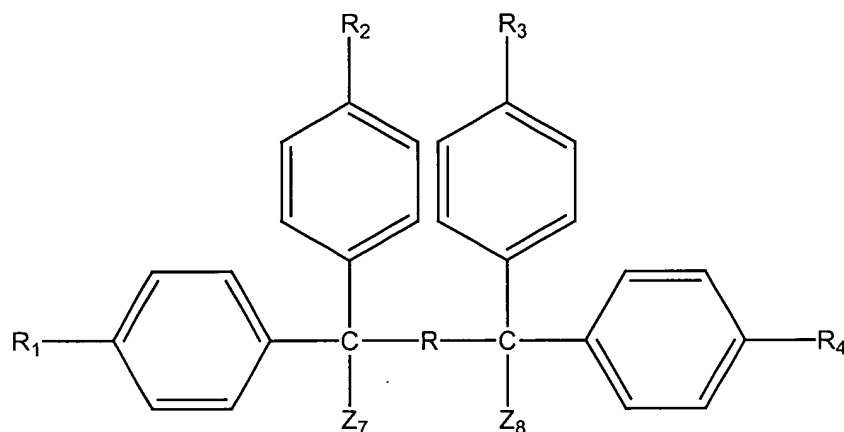


where n is an integer from 1 to about 10,

X<sub>1</sub> to X<sub>8</sub> are independently selected from hydrogen, halogen, linear or branched alkyl, alkoxy, cyano, nitro, nitrile, hydroxyl, or amino groups, and

Z<sub>1</sub> to Z<sub>6</sub> are independently selected from hydrogen, halogen, linear or branched alkyl, alkoxy, aryl, aryloxy, cycloalkyl, substituted cycloalkyl, vinyl, substituted phenyl, cyano, nitro, nitrile, hydroxyl, amino, carboxyl, ester, amide, thio, epoxide, silyl, or silyloxy groups;

or a formula of:



where R is a substituted hydrocarbon moiety,

R<sub>1</sub> to R<sub>4</sub> are independently selected from hydrogen, alkyl, or alkoxy groups, and

$Z_7$  and  $Z_8$  are independently selected from hydrogen, halogen, linear or branched alkyl, alkoxy, aryl, aryloxy, cycloalkyl, substituted cycloalkyl, vinyl, substituted phenyl, cyano, nitro, nitrile, hydroxyl, amino, carboxyl, ester, amide, thio, epoxide, silyl, or silyloxy groups.

2. The golf ball of claim 1, wherein the base polymer comprises *trans*-polyisoprene, gutta-percha, natural or synthetic rubbers, polybutadienes, polyisoprenes, ethylene-propylene rubbers, styrene-butadiene rubbers, styrene-propylene-diene rubbers, chloroprene rubbers, acrylonitrile rubbers, acrylonitrile-butadiene rubbers, polysulfide rubbers, rubbers synthesized using metallocene catalysts or single-site catalysts, ethylene-propylene-diene terpolymers, styrene-ethylene block copolymers, maleic anhydride or succinate modified metallocene catalyzed ethylene copolymers, polypropylene resins, chlorinated polyethylenes, ionomer resins, polyamides, polyethers, polyesters, polyurethanes, polyureas, polyimides, polysiloxanes, silicones, epoxies, or fluorocarbons.

3. The golf ball of claim 1, wherein the carbon-carbon initiator is present in an amount of about 0.01 phr to about 100 phr by weight of the base polymer.

4. The golf ball of claim 1, wherein the elastomeric composition further comprises at least one of a peroxide initiator, a crosslinking agent, a halogenated thiophenol, or an accelerator.

5. A golf ball comprising a core and a cover, wherein at least one of the core or the cover comprises an elastomeric composition comprising a base polymer and a carbon-carbon initiator.

6. The golf ball of claim 5, wherein the carbon-carbon initiator has at least one elongated carbon-carbon single bond of greater than about 1.55 nm.

7. The golf ball of claim 5, wherein the carbon-carbon initiator has a decomposition temperature of about 150°C to about 300°C at a half-life of about 10 hours to about 0.1 hours.

8. The golf ball of claim 5, wherein the carbon-carbon initiator comprises aliphatic hydrocarbon initiators, alicyclic hydrocarbon initiators, aromatic hydrocarbon initiators, substituted carbon-carbon initiators, or oligomeric carbon-carbon initiators.

9. The golf ball of claim 8, wherein the carbon-carbon initiator comprises bibenzyl;  $\alpha,\alpha'$ -dimethoxybibenzyl;  $\alpha,\alpha'$ -dimethoxy- $\alpha,\alpha'$ -dimethylbibenzyl;  $\alpha$ -methoxy- $\alpha,\alpha'$ -diphenylbibenzyl;  $\alpha,\alpha'$ -dimethoxy- $\alpha,\alpha'$ -diphenylbibenzyl; 1,2-dinitro-1,2-diphenylethane; 1,2-dinitro-1,2-di(p-tolyl)ethane; 1,2-dichloro-1,2-diphenylethane; 1,2-dibromo-1,2-diphenylethane; 1,2-dibromo-1,2-dimethyl-1,2-diphenylethane; tetraphenylethane; hexaphenylethane; tetrabromodiphenylethane; pentabromodiphenylethane; hexabromodiphenylethane; heptabromodiphenylethane; octabromodiphenylethane; novabromodiphenylethane; decabromodiphenylethane; 1,2-bis(trimethylsiloxy)-1,2-diphenylethane; 1,2-diphenyl-1,2-ethanediol (i.e.; hydrobenzoin); 1,1,2,2-tetraphenyl-1,2-ethanediol (i.e.; benzopinacol or tetraphenylethylene glycol); 2,3-dimethyl-2,3-butanediol (i.e.; pinacol; pinacone; or tetramethylethylene glycol); 2,3-diphenyl-2,3-butanediol; 3,4-diphenyl-3,4-hexanediol; 1,2-bis(trimethylsiloxy)-1,1,2,2-tetraphenylethane; 2,3-bis(trimethylsilyloxy)-2,3-diphenylbutane; 2,3-bis(trimethylsilyloxy)-2,2,3,3-tetraphenylbutane; 2,3-diethyl-2,3-diphenylsuccinonitrile (i.e.; diethyl-2,3-dicyano-2,3-diphenylsuccinate); 2,2,3,3-tetraphenylsuccinonitrile; 2,3-dimethylbutane; 2,3-diphenylbutane; 2-methyl-2,3-diphenylbutane; 2,3-dimethyl-1,1-diphenylbutane; 2,3-dimethyl-1,2-diphenylbutane; 2,3-dimethyl-1,4-diphenylbutane; 2,3-dimethyl-2,3-diphenylbutane; 2,3-diethyl-2,3-diphenylbutane; 2-methyl-3-ethyl-2,3-diphenylbutane; 2,3-dipropyl-2,3-diphenylbutane; 2,3-dibutyl-2,3-diphenylbutane; 2,3-diisobutyl-2,3-diphenylbutane; 2,3-dihexyl-2,3-diphenylbutane; 2-methyl-2-phenyl-3-tolylbutane; 2-methyl-3-phenyl-2-tolylbutane; 2-benzyl-3-methyl-1-phenylbutane; 2,2,3,3-tetraphenylbutane; 2,3-dimethyl-2,3-di(p-methylphenyl)butane; 2,3-diethyl-2,3-di(p-methylphenyl)butane; 2,3-dimethyl-2,3-di(p-tolyl)butane; 2,3-dimethyl-2,3-di[p-(t-butyl)phenyl]butane; 1,4-bis(1-bora-3,4-diphenylcyclopentyl)-2,3-diphenylbutane; 2,3-dimethyl-2-methylphenyl-3-[(p-2',3'-dimethyl-3'-methylphenyl-butyl)phenyl]butane; 2,3-dimethyl-2,3-di(p-isopropylphenyl)butane; 2,3-dimethyl-2,3-di(p-benzylphenyl)butane; 2,3-dimethyl-2,3-di(2,3,4,5,6-pentamethylphenyl)butane; 2,3-dimethyl-2,3-di(m-hexadecylphenyl)butane; 2,3-dimethyl-2,3-di(p-eicosylphenyl)butane; 2-methyl-3-isopropyl-2,3-di(p-isobutylphenyl)butane;

2,3-dicyano-2,3-diphenylbutane; 2,3-dimethyl-2,3-di(p-methoxyphenyl)butane; 2,3-dimethyl-2,3-di(p-ethoxyphenyl)butane; 2,3-dimethyl-2,3-di(p-chlorophenyl)butane; 2,3-dimethyl-2,3-di(p-bromophenyl)butane; 2,3-dimethyl-2,3-di(p-iodophenyl)butane; 2,3-dimethyl-2,3-di(p-nitrophenyl)butane; 2,3-diethyl-2,3-di(p-chlorophenyl)butane; 2,3-diethyl-2,3-di(p-bromophenyl)butane; 2,3-diethyl-2,3-di(p-iodophenyl)butane; 2,3-diethyl-2,3-di(p-nitrophenyl)butane; 2-methyl-1,1-diphenylpentane; 4-methyl-1,1-diphenylpentane; 2-methyl-1,2-diphenylpentane; 4-methyl-1,2-diphenylpentane; 2-methyl-1,3-diphenylpentane; 4-methyl-1,3-diphenylpentane; 2-methyl-1,4-diphenylpentane; 2-methyl-1,5-diphenylpentane; 4-methyl-2,2-diphenylpentane; 2-methyl-2,3-diphenylpentane; 2-methyl-2,4-diphenylpentane; 2-methyl-3,4-diphenylpentane; 2-methyl-2,5-diphenylpentane; 2-methyl-3,3-diphenylpentane; 3,4-dimethylhexane; 3,4-dimethyl-3,4-diethylhexane; 1,1-diphenylhexane; 1,2-diphenylhexane (i.e.; 2-benzyl-1-phenylpentane); 1,3-diphenylhexane; 1,4-diphenylhexane; 1,5-diphenylhexane; 1,6-diphenylhexane; 2,2-diphenylhexane; 2,3-diphenylhexane; 2,4-diphenylhexane; 2,5-diphenylhexane; 3,3-diphenylhexane; 3,4-diphenylhexane; 2,3-dimethyl-2,3-diphenylhexane; 3,4-dimethyl-3,4-diphenylhexane; 3,4-diethyl-3,4-diphenylhexane; 3,4-dipropyl-3,4-diphenylhexane; 3,4-diisobutyl-3,4-diphenylhexane; 3,3,4,4-tetraphenylhexane; 3,4-diethyl-3,4-di(3,4,5-triethylphenyl)hexane; 4,5-dimethyl-4,5-diphenyloctane; 4,5-dipropyl-4,5-diphenyloctane; 5,6-dimethyl-5,6-diphenyldecane; 5,6-dimethyl-5,6-di(p-cyclohexylphenyl)decane; 6,7-dimethyl-6,7-diphenyldodecane; 7,8-dimethyl-7,8-di(p-methoxyphenyl)tetradecane; 1,1'-diphenyl-1,1'-bicyclopentyl; 1,1'-diphenyl-1,1'-bicyclohexyl; poly(1,4-diisopropylbenzene); or poly(1,3-diisopropylbenzene).

10. The golf ball of claim 5, wherein the carbon-carbon initiator is a hydrocarbon initiator compatible with the base polymer.

11. The golf ball of claim 5, wherein the carbon-carbon initiator is present in an amount of about 0.01 phr to about 30 phr by weight of the base polymer.

12. The golf ball of claim 5, wherein the carbon-carbon initiator is present in an amount of about 0.1 phr to about 10 phr by weight of the base polymer.

13. The golf ball of claim 5, wherein the carbon-carbon initiator is present in an amount of about 0.5 phr to about 5 phr by weight of the base polymer.
14. The golf ball of claim 5, wherein the base polymer comprises at least one polybutadiene having a Mooney viscosity of about 20 to about 150.
15. The golf ball of claim 5, wherein the composition is substantially free of peroxide initiators, sulfur-based curing agents, and crosslinking agents.
16. The golf ball of claim 5, wherein the composition further comprises a crosslinking agent.
17. The golf ball of claim 16, wherein a weight ratio of the carbon-carbon initiator to the crosslinking agent is about 0.01:1 to about 5:1.
18. The golf ball of claim 5, wherein the composition further comprises a peroxide initiator.
19. The golf ball of claim 18, wherein a weight ratio of the carbon-carbon initiator to the peroxide initiator is about 0.05:1 to about 50:1.
20. The golf ball of claim 18, wherein the peroxide initiator has a decomposition temperature lower than that of the carbon-carbon initiator.
21. The golf ball of claim 5, wherein the composition further comprises a halogenated thiophenol.
22. The golf ball of claim 5, wherein the core comprises a center and an outer core layer.

23. The golf ball of claim 5, wherein the golf ball comprises an intermediate layer disposed between the core and the cover.

24. The golf ball of claim 5, wherein the cover comprises an outer cover layer and an inner cover layer, and at least one of the cover layers comprises a thermoplastic or thermoset polyurethane or polyurea.

25. A golf ball comprising:  
a core having a compression, and comprising a base polymer and a carbon-carbon initiator, the carbon-carbon initiator being present in an amount sufficient to increase the compression by at least about 5%; and  
a cover.

26. The golf ball of claim 25, wherein the core has a coefficient of restitution, and the amount of the carbon-carbon initiator is sufficient to increase the coefficient of restitution by at least about 0.001.

27. The golf ball of claim 25, wherein the carbon-carbon initiator comprises 2,3-dimethyl-2,3-diphenylbutane, 3,4-dimethyl-3,4-diphenylhexane, or poly(1,4-diisopropylbenzene).

28. The golf ball of claim 25, wherein the composition further comprises a halogenated thiophenol.

29. The golf ball of claim 28, wherein the carbon-carbon initiator is present in an amount sufficient to increase the core compression by at least about 20%.

30. The golf ball of claim 25, wherein the composition further comprises at least one of a peroxide initiator, a crosslinking agent, an accelerator, a free radical scavenger, a scorch retarder, a stable free radical, a filler, an antioxidant, or a processing aid or oil.

31. A golf ball, comprising:  
a core having a diameter of about 1.55 inches to about 1.65 inches, the core comprising a base polymer and a carbon-carbon initiator; and  
a cover having an overall thickness of about 0.01 inches to about 0.07 inches, the cover comprising a thermoplastic or thermoset polyurethane or polyurea.

32. The golf ball of claim 31, wherein the core comprises a center and an outer core layer, and the carbon-carbon initiator is present in the center, the outer core layer, or both.

33. The golf ball of claim 31, wherein the cover further comprising an inner cover layer and an outer cover layer, the inner cover layer comprising a thermoplastic material, and the outer cover layer is softer than the inner cover layer.